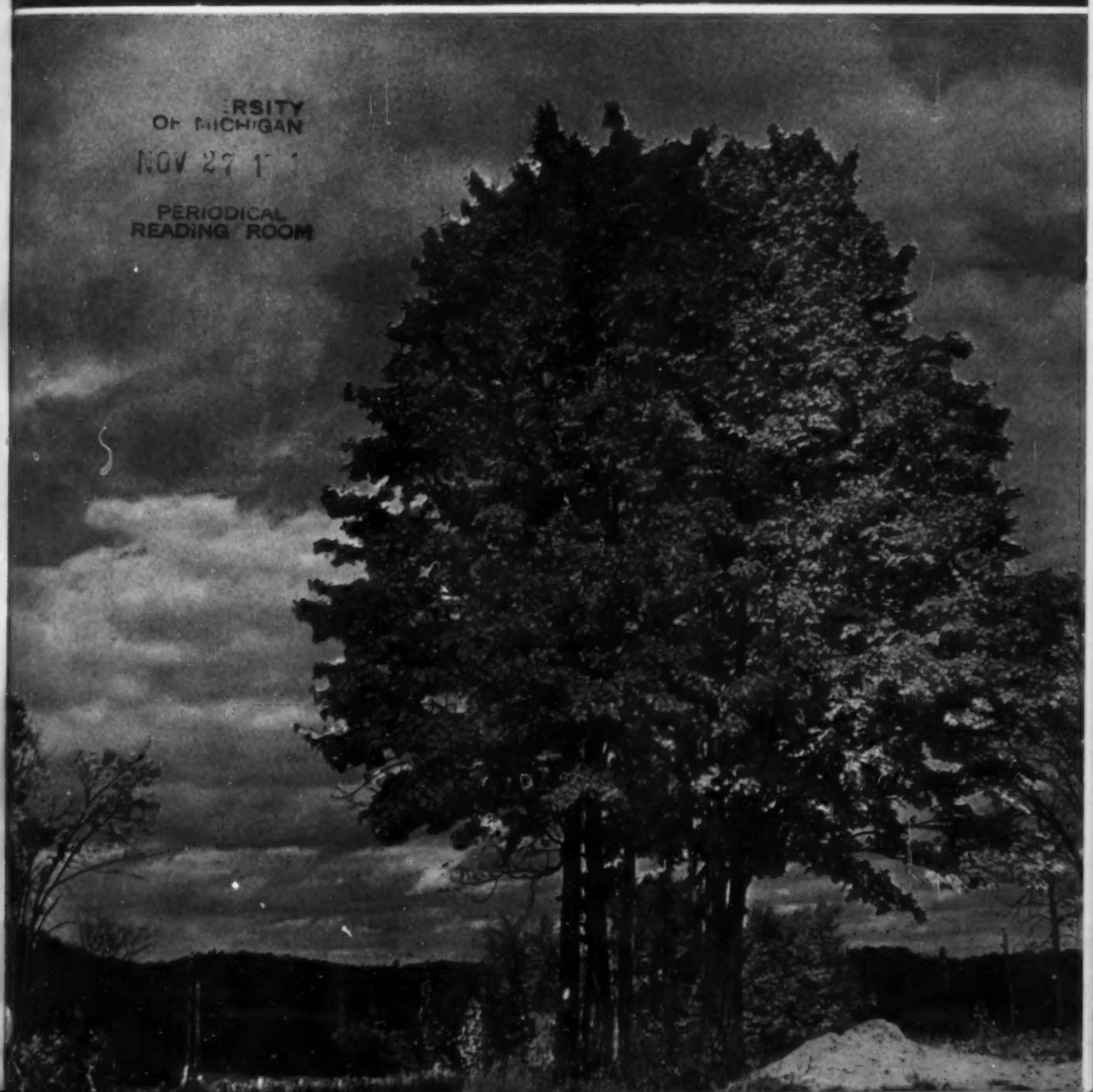
CANADIAN GEOGRAPHICAL JOURNAL

NOVEMBER 1951



THE CANADIAN GEOGRAPHICAL SOCIETY

OTTAWA, CANADA

The Society's ambition is to make itself a real force in advancing geographical knowledge, and in disseminating information on the geography, resources and people of Canada. In short, its aim is to make Canada better known to Canadians and to the rest of the world.

As one of its major activities in carrying out its purpose, the Society publishes a monthly magazine, the Canadian Geographical Journal, which is devoted to every phase of geography—historical, physical and economic—of Canada, of the British Commonwealth and of the other parts of the world in which Canada has special interest. It is the intention to publish articles in this magazine that will be popular in character, easily read, well illustrated and educational to the young, as well as informative to the adult.

The Canadian Geographical Journal will be sent to each member of the Society in good standing. Membership in the Society is open to any one interested in geographical matters. The annual fee for membership is four dollars (Canadian currency).

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The articles in this Journal are indexed in the *Canadian Index* which may be found in any public library.

The British standard of spelling is adopted substantially as used by the Dominion Government and taught in most Canadian schools, the precise authority being the Oxford Dictionary as edited in 1936.

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Colour photograph by G. M. Dallyn

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Opposite page:—Their Royal Highnesses the Princess Elizabeth and the Duke of Edinburgh, from the painting by Edward Halliday which successfully captures something of the dignity and charm that have won the hearts of Canadians from coast to coast.
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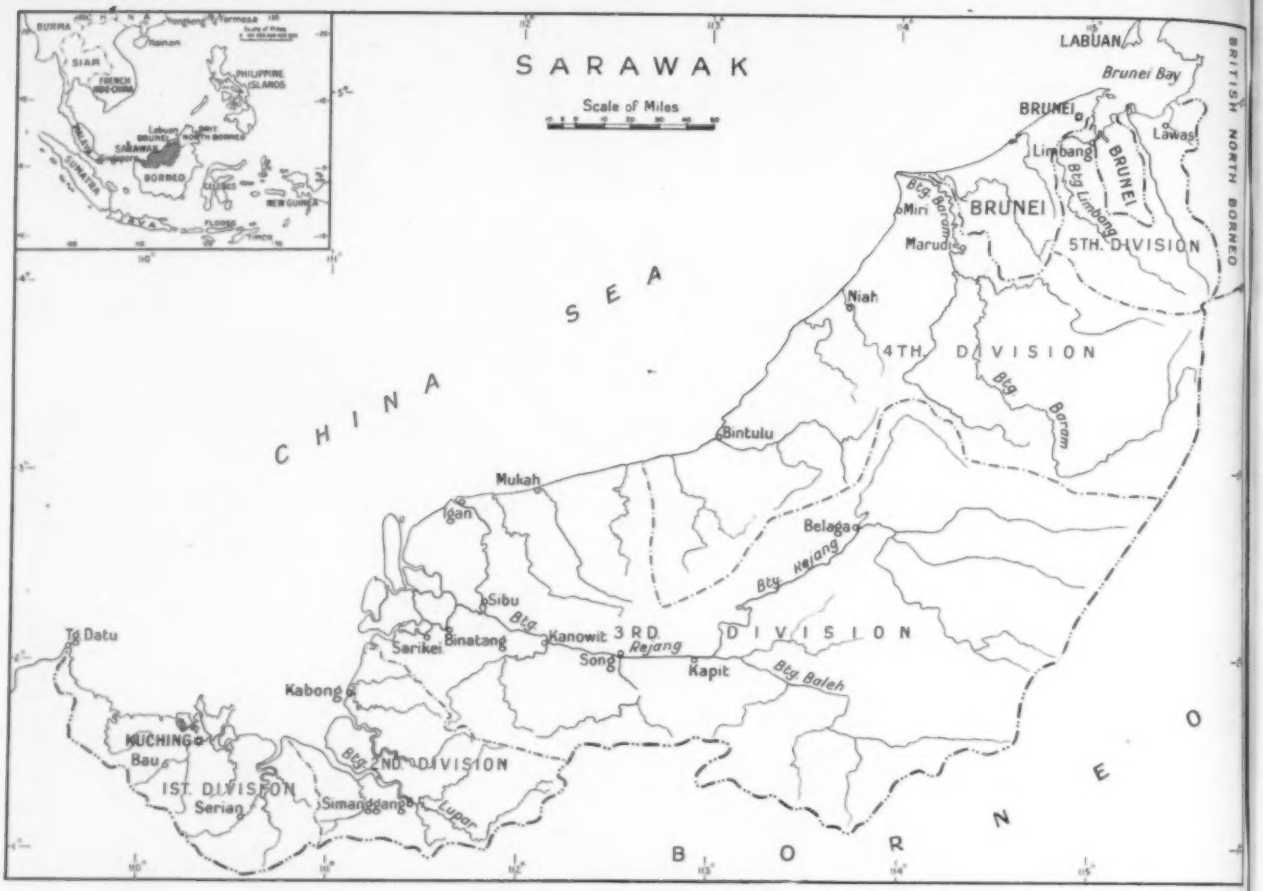

Busy People in Sarawak

Photographs and notes by HEDDA MORRISON

SARAWAK is one of the more remote countries of the world. It covers an area of some 50,000 square miles stretching for 500 miles along the northwest coast of the island of Borneo. When Borneo first became known to the west in the sixteenth century it formed part of the domain of the Sultans of Brunei, then a considerable power controlling most of the coast of Borneo and part of the Southern Philippines as well. But as time went on the power of Brunei declined and decayed. In 1839 a remarkable Englishman, Sir James Brooke, came to visit Kuching. For his help in bringing peace to the country he was made Rajah of Sarawak by the Sultan of Brunei in 1841. At first his power was confined to the area immediately in the vicinity of Kuching in the south of what is now Sarawak but the chaos and anarchy in the rest of the country compelled him and his successor, Sir Charles Brooke, gradually to extend their sway northwards until at the end of the nineteenth century Sarawak came entirely to surround the state of Brunei. The last of the three white Rajahs, Sir Vyner Brooke, eventually ceded Sarawak to the Crown in 1946 since when it has been a Crown Colony.

It is a fascinating country inhabited by an extraordinarily varied and interesting population comprising most of the tribes inhabiting Borneo. The coast is long and generally low lying. Inland the country rises to fair sized hills, up to five or six thousand feet, the highest point in the country being Mount Murud, 8,000 feet, in North Sarawak. There are two great river systems, the Rejang and the Baram, the tributaries of which penetrate far into the country. There are no railways, hardly any roads, and most transportation is by water. Good harbours are lacking and

nearly all the rivers have difficult bars at their mouths. The capital of the colony is at Kuching in the south and for administrative purposes there are five divisions each presided over by a Resident. The boundaries of the divisions are shown on the map.

There are five main racial groups in Sarawak. By far the biggest group is the Iban or Sea Dayak community who number more than 190,000, almost 35 per cent of the population. In former years they were famous as pirates and headhunters; they are now a progressive and law abiding people, concentrated mainly in the 2nd and 3rd Divisions though they are also found in all the other Divisions. The next biggest group is an immigrant one, that of the Chinese who number 145,000 people and are increasing rapidly. They are the traders and shopkeepers, rubber smallholders and pepper planters. They mostly live in and near the larger centres, particularly Kuching, Sibu and Miri. The Malays, who formerly dominated the country, total slightly less than 100,000, mostly around Kuching and in the coastal districts. The Land Dayaks, a quite distinct people, are confined to the 1st Division. When Sir James Brooke first came to the country they were in danger of extinction through Brunei misrule and oppression but they are now a thriving community of 43,000. The Melanaus are another indigenous people, confined to the coastal districts of the 3rd and 4th Divisions, who number 35,000. A considerable proportion of them have embraced Islam. There are some 30,000 other indigenous people belonging to smaller tribes, most of which are very distinct, such as the Kayans, Kenyahs, Punans, Kelabits and Muruts. They are mostly found in the interior of the 3rd and 4th Divisions. Finally there are about 5,000 Indians and Javanese and somewhat less than 1,000 Europeans. From this it may be gathered that the population of Sarawak is an unusually varied one.

The life of the people has one common factor: it revolves around the planting of rice. Sarawak is, indeed, very close to being self-supporting in rice. The most productive form of cultivation is that practised in the alluvial flats of the river deltas and in certain other areas where irrigated, terraced rice fields are used. The inland peoples, however, depend principally on a very wasteful and unsatisfactory form of hill padi cultivation. They cut and burn the jungle and plant the rice on the bare scorched earth without any irrigation. This process, which is repeated over a cycle of ten to fifteen years, does great harm; the good topsoil is washed away, the fertility of the soil is soon lost, and the hills are reduced to barren wastes of rank grass.

Rice is the staple article of diet but rubber is the mainstay of the country's trade. There are hardly any large estates and production is mostly in the hands of smallholders. Other indigenous exports are sago, pepper, jelutong, timber and forest products. Formerly gold and petroleum were important but the Miri oilfields in the north and the Bau goldfields in the south are pretty well worked out. There is, however, a large export of petroleum and its products (first in value on the export list). This petroleum is piped through from the great Seria oilfield in Brunei, now the largest producer in the British Commonwealth, refined at Lutong in Sarawak, and exported.

The Malays and other Islamic peoples live scattered in their *kampongs* or villages. The Chinese reside in the bazaars or on their smallholdings. The majority of the other native peoples live in longhouses—villages with a common roof. The longhouses vary slightly as between the different races but in general have a long communal room from which the individual family rooms open off. The house is presided over by a Headman or *Tuai Rumah* and groups of houses come under a Chief or *Penghulu*, a post that is sometimes hereditary and sometimes elective. The life of the people is largely regulated by their old traditional customs and they are being encouraged to manage their own affairs by a system of local authorities.

Much has been written about the way of life of the natives but perhaps the easiest way to show how they work is by means of photographs, of which a selection will be found in the following pages.

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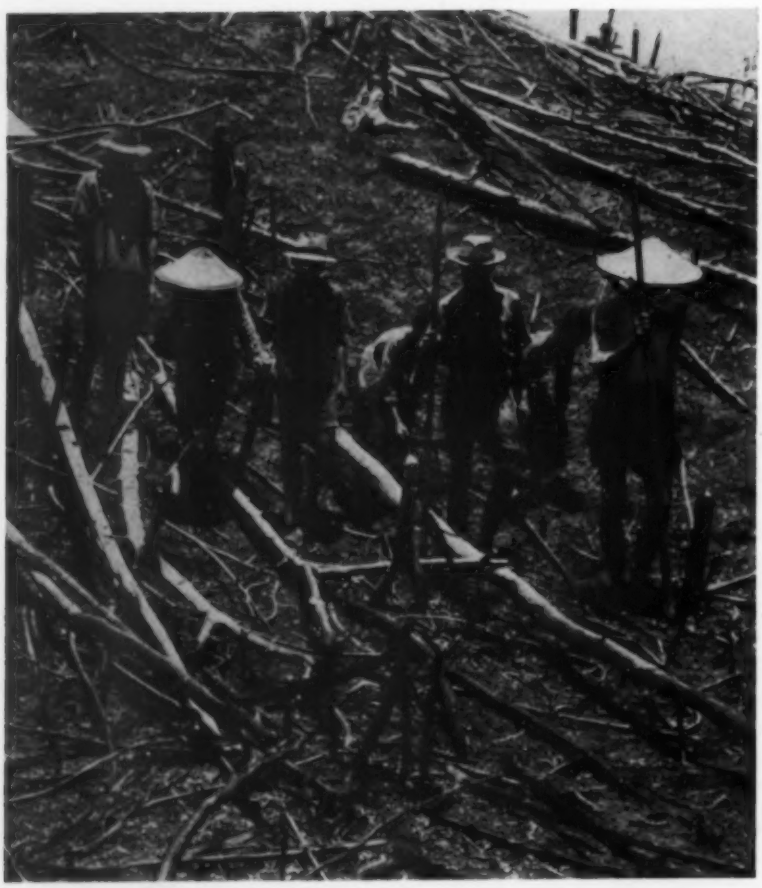

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1. Rice (*padi*) cultivation as practised on the alluvial deltas. In the photograph a Malay girl plants out young rice plants that have been grown in special nurseries. The rice fields are fertile, muddy swamps.

2. Muruts, a people whose territory comprises the 5th Division of Sarawak and a large area of East Borneo, plant hill *padi* in the traditional way, after cutting and burning the jungle. Planting is done in small groups; the men walk in front with pointed poles with which they make holes into which the women behind drop the grains of seed rice.

3. Most of the irrigated rice is grown near the coast but in some of the upland, interior areas there are elaborate irrigation systems

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as here at Bah Kelalan in the 5th Division near the Netherlands border, at an altitude of some 3,000 feet.

4. Land Dayaks from Serian in the 1st Division pounding *padi* to remove the husks, a heavy task always performed by the women. Peculiar to the Land Dayak women are the brass rings worn round the legs.

5. Rice is cooked in various ways but it is always the staple article of diet when available. Here an Iban woman of the 3rd Division is preparing to cook rice in a section of bamboo. The diet tends to be unbalanced, with a preponderance of rice; only the Chinese appreciate the importance of vegetables and grow them freely. When rice is scarce sago is substituted.

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6. Chinese girl tapping rubber on a smallholding. Nearly all the production comes from holdings of a few acres each. Chinese are the principal smallholders but most people grow some rubber. The work being largely done by families, production can still be maintained even when the price is very low.

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7. The latex, a milky substance which runs freely when the bark is cut, is coagulated with acid and then formed into sheets which are here being run through a roller.

8. The sheets are dried, washed, and finally smoked before they are ready for export. Rubber is the mainstay of Sarawak economy and about 45,000 tons were exported in 1948.

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9

9. Tropical forest covers much of Sarawak and in it is valuable timber. Here Melanaus are manhandling a log in swamp forest in the 3rd Division. Their system is not to lever the log itself, but to put it on two smaller logs with holes through them in which poles can be inserted to give good leverage.

10. This raft of big logs on the lower Rejang River consists of lumber awaiting export to Australia.

11. An important forest product is cutch, a brown dye containing tannin, which is extracted from the bark of mangroves. Cutch is a valuable export being used as a dye for fishing nets. Melanau fishermen are seen here dyeing their nets in a solution of cutch in an old canoe beneath their stilt house.

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12. An important though fluctuating product is sago. Sago is the starch contained in the pith of a tall palm that grows in the coastal swamps. The palm is felled, cut into sections and towed to the nearest village. There the bark is cut off and the pith rasped into the consistency of coarse sawdust.

13. The pith is then placed on a mat over a trough and water is poured over it while the workers stamp on it. The result is to wash out the sago, almost pure starch, which settles in a cheesy mass in the bottom of the trough while the useless residue floats or is thrown away.

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14. Another method is to put the pith into a basket instead of on a mat. Water is poured over it and the basket vigorously shaken up and down by a worker standing inside it. The most important producers of sago are the Melanaus of the coastal districts of the 3rd Division.

15. Exporting sacks of sago from Sibu to Singapore. Sibu can be reached by ships of about 1,000 tons and Kuching by ships of some 1,800 tons. In 1948 Sarawak exported 56,000 tons of sago flour. One of the early native names for Borneo was "Pulau" Klemantan, the Isle of Sago.

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16. Most of Borneo's pepper plants died from lack of attention during the war, but renewal of cultivation made pepper Sarawak's fourth export in 1949. Commercial pepper is the seed pods of a climbing vine which is trained on hardwood stakes and begins to yield after about three years. Cultivation is entirely in the hands of Chinese gardeners.

17. Here immature pepper seeds are being removed in order to stimulate growth in the young plant.

18. There are great caves in limestone areas of the colony inhabited by immense numbers of small swifts (*Collocalia*). These birds form peculiar nests, from salivary excretion, that are a great delicacy to the Chinese. Birds' nests for soup are a valuable export and here a collector is seen at work perched high up on flimsy bamboo scaffolds at Niah in the 4th Division removing the edible nests from roof and walls of a cave. The

19

height of some of these caves is several hundred feet and collecting the greyish cup-like nests which cling to the walls is a precarious job carried out by the light of torches and candles. When the nests have been removed, the swiftlets will rebuild and lay fresh clutches of eggs two or three times; the final nests are left until the eggs have hatched and the fledglings have taken to the air. Sometimes nests are taken too soon and many young birds are lost.

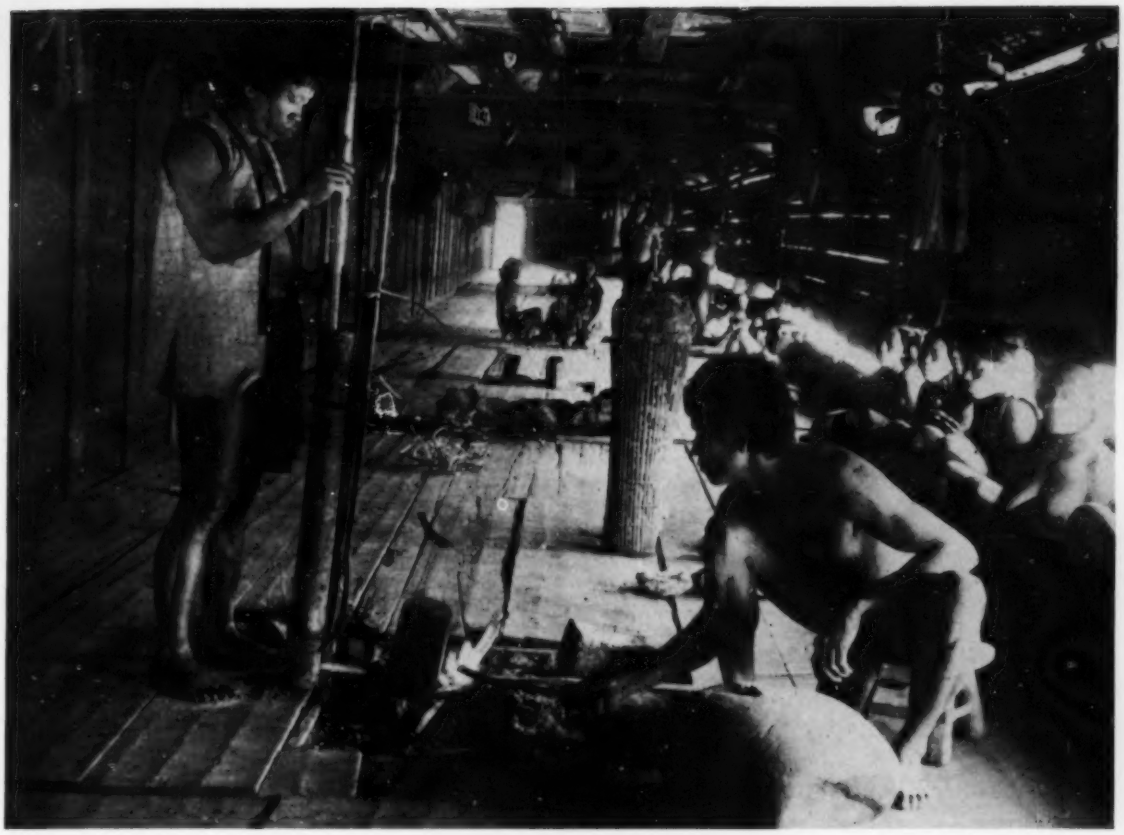
19. Jelutong is a latex used in the manufacture of chewing gum. It is the product of trees found wild in the jungle but not under cultivation. The latex is coagulated in the same way as rubber, into large white lumps, but it cannot be smoked like rubber and can only be kept for a limited time immersed in fresh water. Here an Iban is putting a mass of jelutong in a jungle stream.

20. A jungle tree being tapped for jelutong. The trees are tapped twice a month in two places at once, as shown.

20

21. The Chinese have a virtual monopoly of retail trade and here is a typical Chinese shop. Most of these shops buy rubber and other produce and sell rice, sugar, flour, salt fish, tinned goods, cigarettes, and so on.

22. Simple cooking pots are made by some of the peoples of the interior though they are not familiar with the potter's wheel. This is a Murut woman at work in the 5th Division; she beats out the pot with a hardwood trowel against a smooth stone held inside. After firing, while the pots are still extremely hot, dammar (a jungle resin) is smeared over them to form a glaze.



23. Several tribes know how to work in iron and here in a Murut house near the Netherlands border two men are at work, the one on the left operating primitive bellows.

24. Some textiles are made locally, though most of the cloth is imported. The most primitive type of cloth is made from the inner bark of a tree which is beaten out into a rough but strong material. Sometimes strips of this bark cloth are woven into a finer material. The Ibans are clever at working cotton which they grow in small quantities and the photograph is of an Iban woman at work on her loom.

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25. Most of the Bornean people have little skill in making jewellery, which is done by Chinese craftsmen. But one race, the Malohs from the Kapuas River in Netherlands Borneo, are skilled silversmiths and they sometimes come to Sarawak where they make jewellery for the Ibans. Here a Maloh worker is seen commencing operations on a bar of silver.

26. The Kayans are famous for their beadwork and in this photograph an elderly Kayan woman is seen at work. The greatly distended lobes of the ears, weighed down with heavy earrings, are a feature of many of the inland peoples. The Kayans are a cultured people, of a Mongolian rather than a Caucasian cast of face.

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Many of the women wear distinctive big, round hats, made from palm leaves, bamboo and rattan. The best hats are made with various kinds of plant dyes though unfortunately cheap bazaar paints are often used.

27. The Ibans make hats with intricate black and white patterns.

28. The distinguishing feature of Kayan hats from the upper waters of the Rejang is the elaborate central medallion of fine beadwork.

29. Two Melanau women are shown making the characteristic red and black Melanau hats at Bintulu.

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30. Rattan (Malay *rotan*) is used for many purposes. Here strips of tough rattan are being sewn together to form an attractive floor mat. Other uses are for furniture, building, walking sticks, and as rope. A considerable quantity is exported.

31. The rattan is armed with stiff, sharp spines which render it troublesome to work and they must all be stripped off.

32. Rattans are climbing palms which grow to very great lengths, sometimes several hundred feet. The stems keep the same thickness (some the diameter of a pencil, some as much as two inches) through most of their length. Here a rattan is pulled out of the dense forest.

33. In the lower reaches of the rivers grow immense numbers of nipa palms, which thrive in brackish conditions. They are most useful

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plants; the sap of the flower stem is a source of sugar, the leaves are used for roofing and the stems for building, the inner bark forms the paper for native cigarettes and the ash of the burnt lower stems produces salt. In the photograph a Malay of the lower Rejang is preparing to collect the sap of the flower stem.

34. The most common roofing is a thatch of nipa or other palm leaves. Here a Murut girl is preparing large sections of thatch—which will last from four to seven years. The palm leaves (these are not nipa) are bent over a stick and overlapped, then roughly sewn into place.

35. Salt is manufactured in the Rejang delta. Sea water is poured over the ash of nipa palm stems to dissolve out the salt and the liquid is boiled off the resulting solution. A Melanau workman tops up the little vats made from the tough bark of the sago palm which will last for one cooking over the fire.

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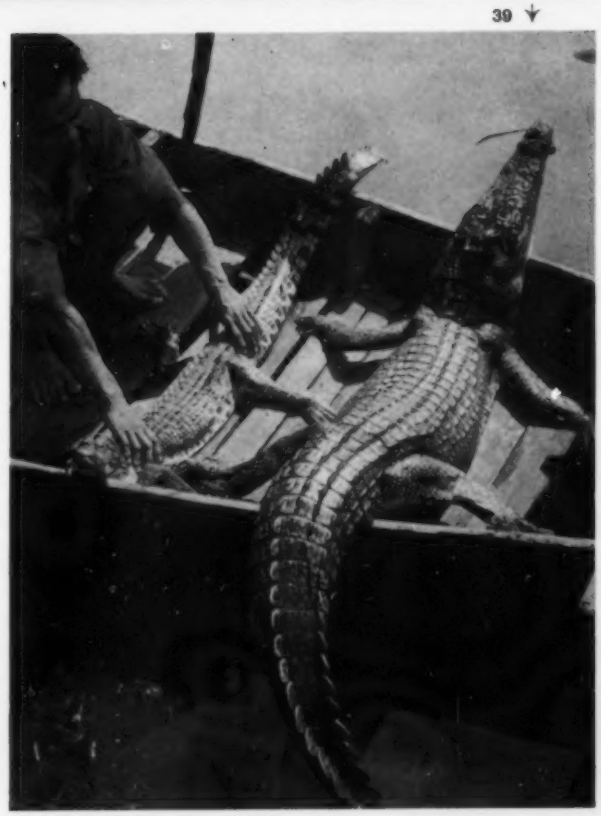

36. Derris or tuba is a small woody vine that grows freely. The roots are exported for use as an insecticide, or used locally to stupefy fish. An Iban Penghulu is here pounding up derris roots preparatory to a fishing expedition.

37. Malays and Melanaus are skilled sailors and fishermen who use quite different fishing methods from those of the Chinese fleets which operate along the Sarawak coasts. Melanaus are seen putting out a large fish trap or *pangree* that will gather fish with the outgoing tide.

38. Canoe building is an important art where communications are largely by water and all races are clever at it. The man in the photograph is an Iban headman from the lower Rejang in the 3rd Division.

39. Crocodiles are plentiful in Sarawak but they do not cause many casualties. Their skins are valuable and the crocodiles are harpooned at night when they are attracted to small lamps left out on the river bank.

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40. The principal native use of dammar is for lighting purposes. Small pieces are burned on top of a wooden stand; they give a flaring light and a very agreeable aromatic odour. The photograph shows Muruts using a dammar lamp. The bead head-dresses of the women are distinctive.

41. Dammar is a valuable forest product—a resin from which a clear, hard varnish is made. Here a Kayan of the Upper Rejang above Belaga loads a canoe with bales of dammar for shipment down river for sale in the bazaars. The resin oozes from coniferous trees and hardens on exposure.

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42. A little girl in Sarikei in the Lower Rejang sells bananas, oranges, rose apples and other local fruits, and cigarettes. When the day's work is over, the entire stall will be packed up and taken home, slung at each end of a bamboo pole that is carried over the shoulder.

43. A Chinese woman in the Lower Rejang walks along a country track taking a supply of edible bamboo shoots to market.


holy holy holy

The Old Crow Altar Cloth

by DOUGLAS LEECHMAN

THE women of the village of Old Crow in the far north of the Yukon* are noted even among the Indians for their skill in beadwork, and this is no mean distinction in a district where every village prides itself on its needlework. One of the best examples of their art is to be seen in an altar cloth in the local church, a simple little structure of spruce logs and certainly not large enough to accommodate the hundred and fifty people who make up the population of Old Crow.

This altar cloth, if so it may be called, as well as the various accessory pieces which belong with it, is made of creamy-white bleached moose hide, intricately decorated with designs in beads. Though the colours are strong, they are well selected and harmonious, giving a brilliant effect without destroying the clean simplicity of the rich moose hide. Most of the designs are floral, originating strangely enough in the Renaissance patterns which French nuns taught their pupils in the missions long ago. The few geometrical designs used are more likely to be of native origin.

The congregation is justly proud of this unusual altar cloth and it is used only on special occasions. There is a similar one in Fort Yukon and every tourist who reaches this remote part of the world makes a point of seeing it. In Old Crow, tourists are unknown.

Moose are said to be comparative new comers in the Yukon and some of the older Indians insist that they still remember the first one. Today they are an important item in the native economy and the preparation of moose and caribou hides is an almost constant occupation of the women. A large hide measures about seven by ten feet or more and the various processes of dehairing, scraping, softening, and smoking or bleaching take a lot of time. The Indians say "Seven days from moose to moccasins" and it is the scraping that takes most of the time. Some women still use the skin scrapers of their stone-age ancestors, preferring stone to steel tools. Each one has her own preferences and recipes in the minor details of skin preparation but to the uninitiated the end product seems much the same. Moose and caribou hides were used extensively for making clothing in the old days and were employed almost exactly as we use cloth.

Hides for very fine work are carefully selected, free from bullet holes or blemishes revealed in tanning. Repeated washings in an emulsion of brains in water bleach the hide and, of course, the common smoking practice which turns the hide yellow is omitted. In the best work the beads are strung on a fine sinew thread, much stronger than cotton, and this thread is stitched back to the hide at frequent intervals. The back of good work is often hidden by a thin sheet of hide, sewn to the edges, so that none of the stitching is visible.

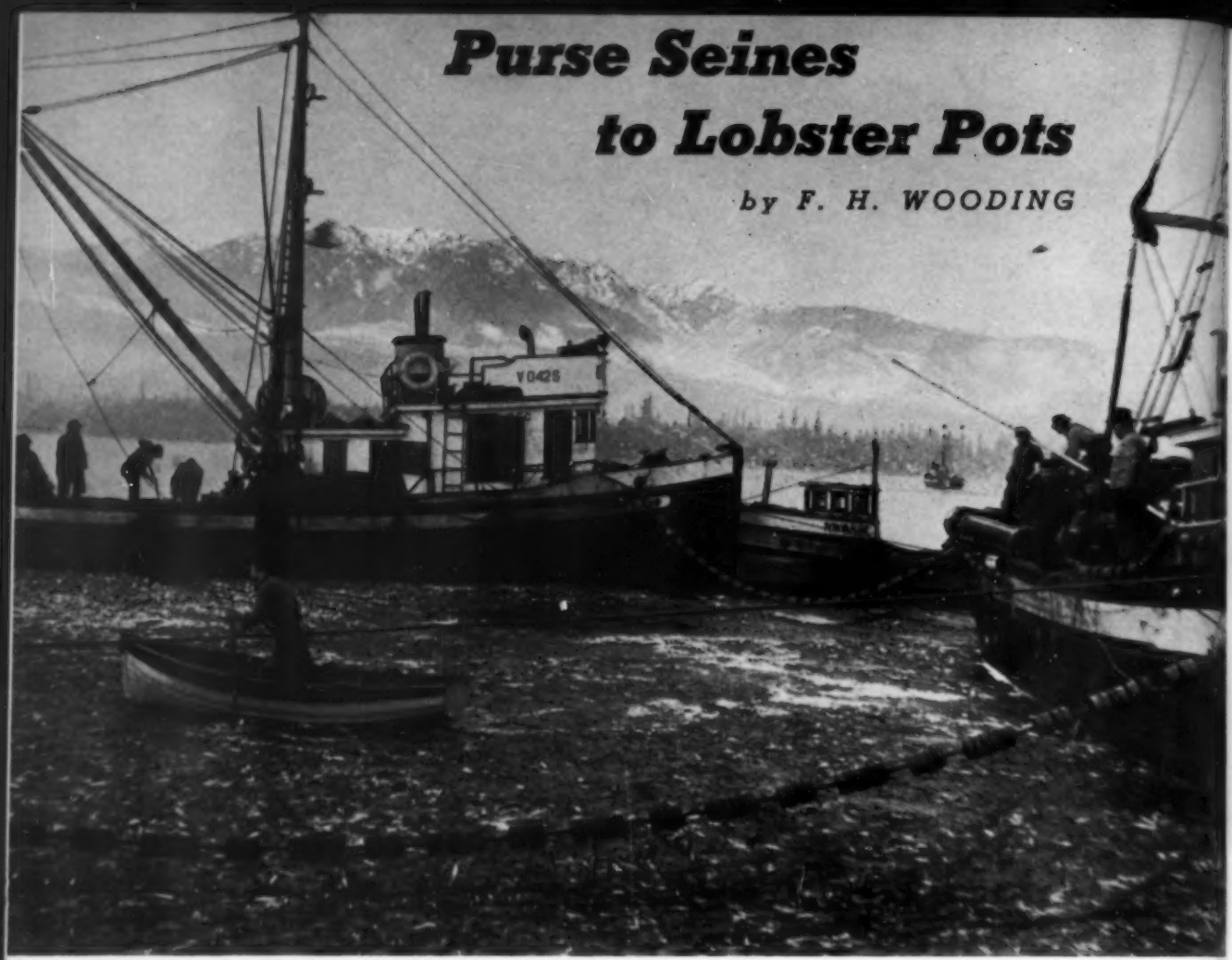
Beads are expensive and hard to obtain in these days, and during the war they were almost unprocurable. So scarce were they in 1946 that I saw women taking old pieces of beadwork to bits, so that they might use the beads again.

Old Crow beadwork is much in demand and dealers in such places as Fort Yukon, Fairbanks, Dawson, and Whitehorse make frequent requests for it. Belts about eight inches wide, heavily beaded and decorated with pendants and tassels, are used by the women when carrying their little children on their backs; dealers are quite ready to pay fifty dollars each for these, and sell them to tourists for a good deal more. Moccasins are popular, too, and are to be had in two patterns. Those about ten inches high with a solid bead leg cost about twenty-five dollars a pair; smaller ones with a low wrapping round the ankle bring ten or fifteen dollars.

*See Canadian Geographical Journal, July, 1948.

Purse Seines to Lobster Pots

by F. H. WOODING



THE big Pacific seine boat, *Maple Leaf C*, made its way slowly through Ogden Channel, just south of Prince Rupert.

In the wheel house Captain Mel Stauffer puffed slowly on his pipe. It was an average day on the "Inside Passage" and the skipper was out for fish. Beside him were most of the instruments of modern commercial fishing—ship-to-shore telephone, radar, echo-sounder and automatic pilot. Of these, only the echo-sounder was in operation, its mechanism moving continuously as it recorded on paper the nature of the ocean floor below.

Suddenly it began showing a dark mass. Was the vessel over a shoal, in danger? Captain Stauffer studied the lines intently and excitement lit up his face as he ordered the engines stopped.

"Fish", he said. "We're over a big school!"

What happened during those next twelve hours made history in the commercial fishery of British Columbia. With little more to go on than native intuition and faith in a small scientific instrument the skipper directed his crew to lay out the ship's 1,650-foot purse seine. In a matter of minutes the net had encircled a seething mass of small, silvery fish and the rings of the purse, 36 fathoms down, were drawn together to form a closed pocket. Inside that trap, with hardly enough room to move a fin, were 1,450 tons of herring!

It was a tremendous set; so big, in fact, that Captain Stauffer, realizing the inability of his own vessel to handle the load, sent an emergency call over the radio-telephone to other seiners operating for the same company to speed to his aid. This help was sorely needed, for not only was the harvest a valuable or : but there was very real danger that at any moment the fish might stampede to freedom and a $15,000 net would be badly damaged.

Meanwhile the work of brailing the herring

At top:—Hundreds of tons of herring are taken in giant purse-like nets in the coastal waters of British Columbia.

into the hold of the *Maple Leaf C* went on. So thick were the fish that it was necessary to fetch out the ship's hoses and direct streams of salt water into the net to provide air to keep them alive. By the time the *Maple Leaf C* was filled, other carrier boats had drawn alongside to relieve the pressure. When the net was emptied, half a day later, practically every pound of the 1,450 tons had been taken. Landed at plants at Namu, Alert Bay and Vancouver, the haul had a value of about $35,000.

While the *Maple Leaf C* set a new record for British Columbia herring seiners, single catches of several hundred tons of herring are not uncommon on the Pacific Coast with this type of net. Of its efficiency there is no doubt and perhaps it is an outstanding example of man's ingenuity to devise ways of capturing fish in commercial quantities. Nearly two billion pounds of fish are taken each year by Canadian fishermen from both the Pacific and Atlantic oceans and from inland waters. To garner this great harvest, an amazing variety of boats and fishing gear is used. There are nets to snare the fish by the gills, nets to hold them in box-like traps and nets to pocket them in a purse-like bag. Baited hooks, trolls, spears, harpoons, rakes and dredges also play an important part in landing the catch.

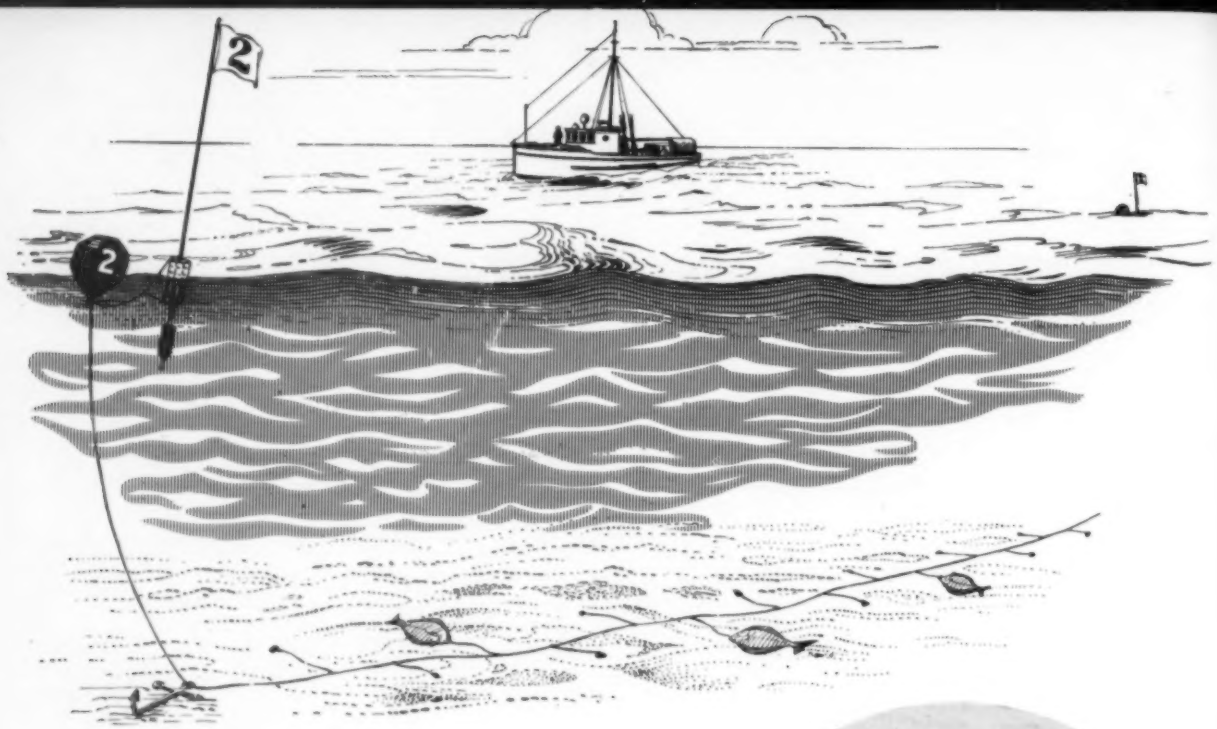
CATCHING FISH WITH BAIT

Perhaps the simplest way of catching fish —and one that is familiar to most of us—is with a hook, baited with something to lure the fish to bite.

Long ago commercial fishermen developed a multiple-hook line known as a set-line, long-line or trawl. Off the British Columbia coast, halibut are caught entirely this way. In the Maritime Provinces and Newfoundland, it is an age-old method of capturing cod, halibut, haddock and is just as popular today in certain communities as it was in the days of sail, although more modern methods have since been introduced. The long-line consists of strong rope made up in lengths of 300 feet. Into this ground-line, as it is called, are spliced the "gangens" or "snoods" of lighter line, to which the hooks are attached. Baited with pieces of herring, squid or clams, these long stretches of line-and-hooks are set out over the sea-bottom where bottom-feeding fish such as the halibut, cod, haddock, hake, pollock, cusk and others of their kind are likely to be looking for something to eat.

The Pacific halibut are big fish and call for heavier lines and hooks than those for cod and haddock. In contrast to the Atlantic operation, fishing for halibut in Pacific waters is a fully mechanized operation. Motor-propelled vessels navigate over the

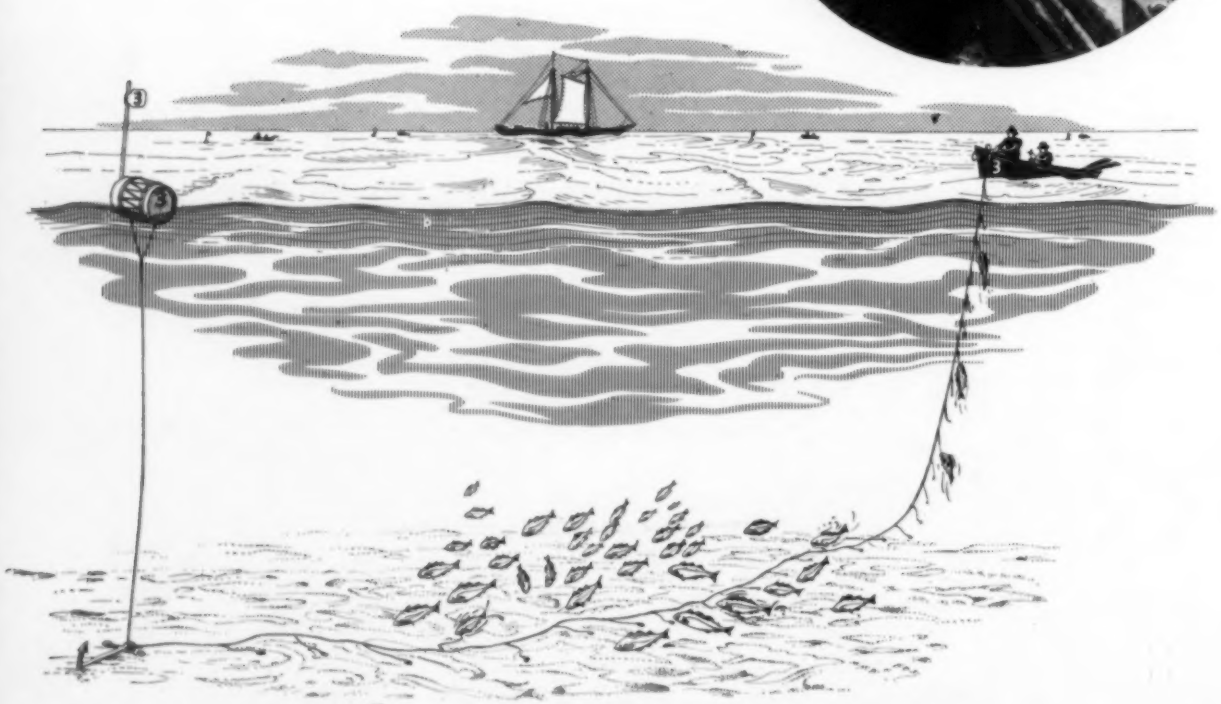
Skill is needed in launching dories from fishing schooners in the Atlantic.



Above:—How halibut long-line fishing gear is rigged and set off the Pacific coast.

Inset:—Landing a Pacific halibut.

Below:— In Atlantic long-lining from dories for cod, haddock, etc. the lines and hooks are lighter than those used for halibut.



grounds, and the lines are hauled in with powerful winches. Several lengths of groundline are joined together so that one boat might pay out over the stern from two to eight miles of line with from 700 to 3,300 baited hooks on it. Light anchors at intervals keep the line stretched along the ocean floor and a buoy, fitted with a pole and a flag, marks one end of it. After the gear has remained in the water for an hour, or several hours, the lines are hauled back over the side of the vessel and if the skipper who directs the operation knows his ground, and the time, tides, currents and other factors are right, there will be plenty of fish to disengage from the hooks, to dress and pack in ice down in the hold.

The halibutters are some 40 to 80 feet in length, with crews of from four to twelve men. Most of them are owned and operated by the fishermen themselves. The smaller boats fish the inshore areas, the larger craft venture far into Alaskan waters. Prince Rupert, Vancouver and Victoria are the principal home ports of the Canadian fleet.

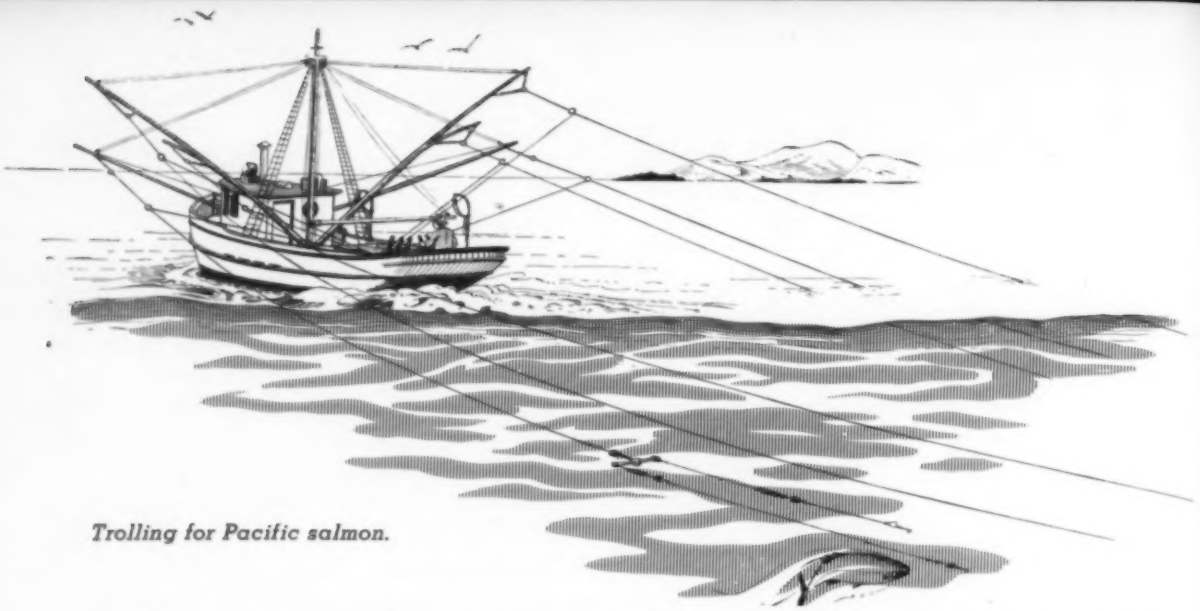
Miles of Hooks and Lines

In Atlantic fishing the fishermen of Newfoundland, the Maritime Provinces and Quebec, set the long-lines or trawls from many types of boats. Some are open motorboats which stay fairly close to the home port and tie up every night in the many snug coves which characterize that coast. Some are small powered schooners which remain at sea two or three days. Such schooners carry from two to four small boats called dories which are launched from the mother ship and are each manned by two men who set and haul in the lines by hand. Some are big schooners ranging from 100 to 145 feet in length, which fish the offshore "banks". They carry from eight to twelve two-man dories, which are constructed so they can be "nested" one inside the other when not in use. When the dories are launched, each one sets as much as two and a half miles of baited hooks. In the years past, when the *Bluenose* made famous this particular type of ship, sail was used entirely to propel these craft to and from the grounds. When power came in, the style of fishing did not change. New vessels held closely to sailing hull lines, adding more beam and length to carry the increased weight of motor and fuel and give more fish-carrying capacity. They carry but little sail on their two short masts nowadays—just enough canvas to assist the engines in fair winds and to keep the vessel moving under control when the engines are stopped.

On the passage to the fishing grounds, the crew overhaul their gear. Approximately 18 miles of line with 30,000 or more baited hooks are distributed over the fishing ground in one set by a single schooner. This gives some idea of the extent to which the luring of fish to take a hook is carried out. Of course there is not always a big fish dangling on every one of these hooks. Many hooks are untouched, many have the bait removed by cunning fish and many have dogfish, sculpins, lumpfish and other species which are worth little or nothing at the fish market.

In addition to the arduous and hazardous life of deep-sea fishermen, the dory fishermen have extra discomforts and perils. Rolling and pitching in a small open boat on the broad Atlantic would not be too happy an experience for most of us. Many men have been lost by losing touch with the mother ship during sudden fogs and snow-squalls. With the adoption of motor power in the fleets, the radio which warns of approaching storms, and direction-finding devices, the risks are reduced. But the dory fishermen still have to rely on their own individual skill and their own high degree of independence. Real skill is especially needed in launching dories and returning them to the schooner deck, and in keeping the small craft from capsizing or swamping in heavy seas.

Like the sports fisherman who pulls a "plug" or "spinner" lure through the water to attract his quarry, the commercial fisherman finds trolling a useful method of catching fish. But he goes one better than the angler, trailing as many as 18 spoons behind his boat. Spring and coho salmon on the Pacific Coast frequently react to the flash-



Trolling for Pacific salmon.

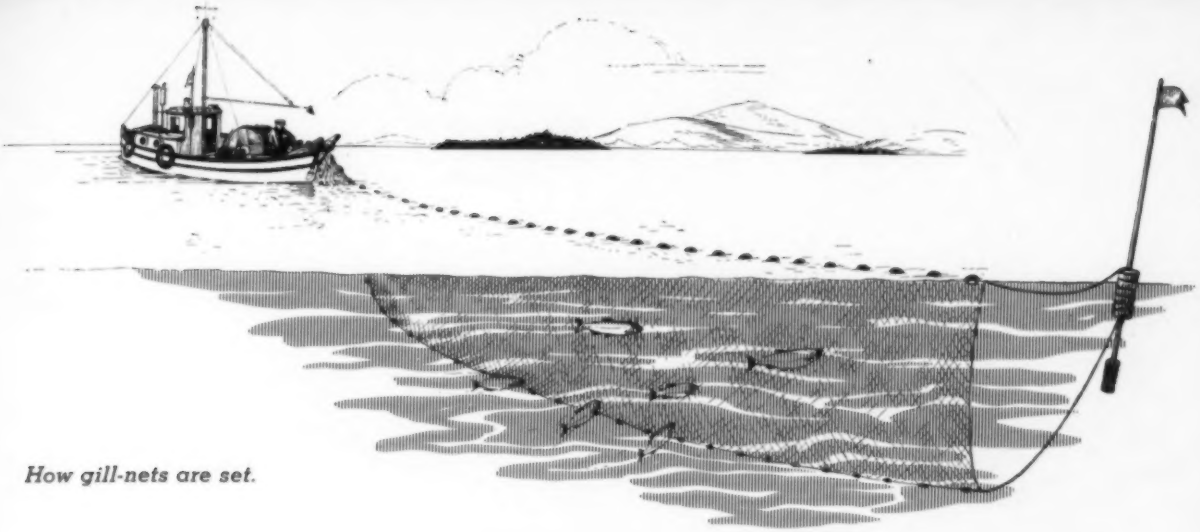
ing lures and a considerable fleet of salmon trollers make a good living for their owners in British Columbia waters. Albacore tuna —sleek, streamlined Pacific coast fish— are also caught by trolls. The boats used are small power vessels, with two or three-man crews. The trailing lines are set from as many as four or six long poles, extended from the sides of the boat in such a way that the lines will keep clear of one another. Trolling equipment is quite elaborate with winches connected to the boat's engine and independent spools for each line. A clutch controls each spool and any one of the lines may be paid out or hauled in without interfering with the others.

Baited Traps for Lobsters

Although long-lines and trolling lines are the main methods of luring fish, there is another method which falls within this category. It is the baited trap, used in the lobster fishery around the coasts of the Maritime Provinces and in the Gulf of St. Lawrence— the greatest lobster grounds in the world. Long ago, fishermen found that although the lobster could not be lured to bite on a hook, it could be induced to crawl into a box-like trap inside of which a piece of herring, mackerel, a small flounder, or a cod's head was placed as bait.

Fishermen make these "pots" with wooden laths and a mesh of twine. The lobster, smelling the bait, crawls through a funnel-shaped opening in the netted end of the trap and cannot easily get out. These simple contrivances are highly efficient since over 40,000,000 lobsters are hauled from Canadian waters annually. The traps are weighted, usually with flat stones, to keep them on the bottom, and their location is marked with buoys. They are set singly or on a line with as many as fifty or sixty on a single rope. Motor boats are usually used to service the traps and some have power driven winches to haul them up. It is said that there are some two million

A fisherman and his son lay lobster pots. The pots are tied to a trap line, then pushed free of the boat.



How gill-nets are set.

lobster traps owned by Canadian fishermen. They are not all in operation at one time, however, because open seasons vary in different localities. Many traps are also kept in reserve as replacements.

Another crustacean, the crab, is also caught by baited traps as well as by ring-nets. The ring-net, with bait placed in the centre of it, is lowered to the bottom. The crab crawls on and is drawn to the surface, his ultimate destination usually being the cannery.

SNARING FISH WITH NETS

The use of a baited hook or trap in harvesting Canadian waters calls for some voluntary action on the part of the fish. Productiveness is therefore limited since fish are not always hungry or in the mood to chase some enticing object even for the fun of it. By far the largest number of fish, therefore, is caught by nets of some kind or another. There are many different net-made contrivances and these catch fish in different ways. In some cases the fish swim blindly into them, becoming entangled in their meshes. In others they are diverted from their course by a barrier across their path, leading into a trap of netting, or they may be surrounded with a bag of netting from which there is little chance of escape.

Despite the fact that fish have eyes and, according to fisheries biologists, most of them can see quite well, millions each year blunder into thousands of yards of nets which are set out like underwater curtains. Made of fine linen, nylon or cotton twine netting, light and strong, the gill-net, as it

Hauling in the catch from a salmon gill-net.

The unusual method of catching shad in gill-nets in the Bay of Fundy.

is called, seems practically invisible to the fish swimming towards it. Their pointed heads go through one of the diamond-shaped meshes until they can go no further. They try to back out, but their gills—which keep opening and closing if they are to live—get caught and they are there until they are "husked out" by the fishermen.

The size of the mesh depends on the kind of fish it is designed to catch. Fisheries regulations prohibit the taking of immature fish and therefore the mesh must be large enough to permit the young ones to escape. Gill-nets are most useful in catching surface-swimming fish such as salmon, herring, mackerel, smelts, whitefish and lake trout; they also catch cod and pollock. Even the belugas of Hudson Bay, which sometimes weigh up to 1,800 pounds, are caught in a type of gill-net. As there is a great deal of difference in the sizes of these fish, a considerable variation exists in the size of the mesh, depth and length of gill-net employed. But the general rig of the net is the same. The top is kept up by a series of floats made of cedar, aluminum, plastic, cork or glass and the bottom kept down by lead weights or stones. This arrangement holds the net vertical in the water.

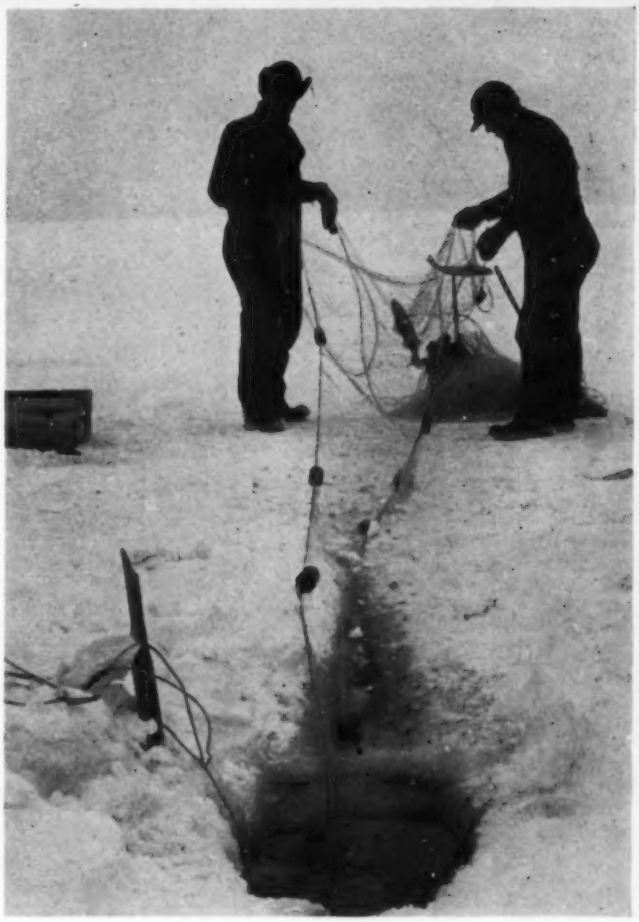
Gill-nets used in a unique fishery in the Cumberland Basin at the head of the Bay of Fundy are rigged high on poles firmly set in the ground between high and low tide marks. The tides of Fundy rise and fall as much as 30 feet and shad are caught in the nets when the tide is in. When the tide goes out, fishermen drive a wagon and team of horses out from shore, climb up ladders to reach the nets, and remove the fish.

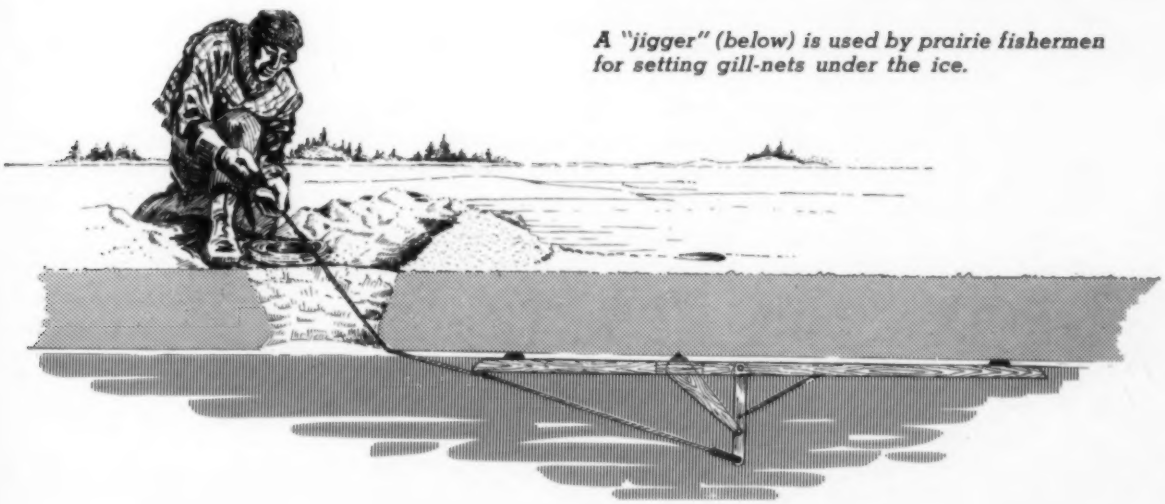
A large share of the British Columbia salmon catch is accounted for by the gill-net fishermen. The nets are set across the inlets and mouths of rivers into which the salmon are travelling to spawn. Small power boats are used, the gill-net being paid out over a mechanically-operated wooden drum in the stern. The nets are set to drift with the current of the river, or the tide, and for this reason are sometimes called drift nets. The gill-net is a popular device in the freshwater fisheries of the Great Lakes, Great Slave Lake in the Northwest Territories and other inland lakes of Canada. Sizable steam or motor vessels as well as smaller power-boats make daily trips to the fishing areas. Sometimes the nets are joined end to end, stretching many miles over the fishing grounds. In the Great Lakes the mechanical gear used for hauling in the gill-nets has been highly developed.

A typical Great Lakes craft used in gill-net fishing.

The Prairie Jigger

An ingenious device known as a "jigger" enables freshwater fishermen to hang a gill-net under the ice during the winter months. Said to be evolved by an Icelandic fisherman in Manitoba, the "jigger" consists simply of a cedar plank about six feet long, slotted to receive a wooden lever. When a net is to be set under the ice of a frozen lake, a hole is cut and the jigger is thrust under. The plank floats hard against the ceiling of ice but it can be propelled forward by the wooden lever. The lever is operated by a rope worked by the fisherman. The noise it makes enables the fisherman to follow its course and when it has traversed the required distance, another hole is cut to recover it and the attached line. This line is then used to thread the net under the ice. Winter fishing in the Prairie Provinces is an important industry since the cold weather provides nature's own deep freeze to permit the shipment of fish to market in prime condition.

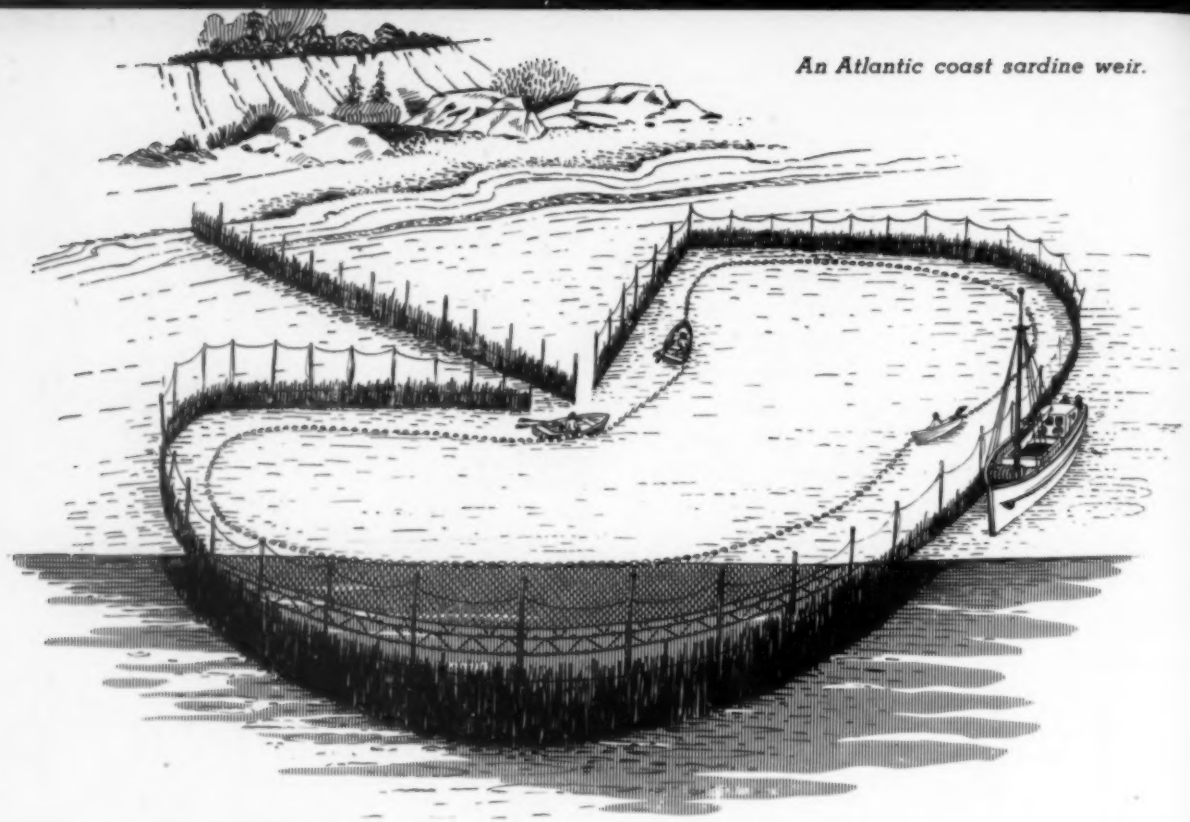




A "jigger" (below) is used by prairie fishermen for setting gill-nets under the ice.

Fish Traps

Nature gave to fish a habitat out of sight of man. But long ago man learned of their movements and habits and has since used this knowledge to great advantage. For ages fish have been snared in devices which involve the principle of diverting them from their course by a barrier across their path. These devices are known as trap-nets, pound-nets or weirs. The design of a fish-trap is quite simple. In places where fish are known to cruise near the shore searching for feeding or spawning grounds, or merely moving with the currents, a barrier is stretched outwards from the shore to deeper water. It consists of poles or stakes



An Atlantic coast sardine weir.

driven into the bottom and wire, fibre-netting or brush filling the gaps. At the outer or offshore end of the barrier is the trap, an enclosed space, constructed the same way and gained by a narrow opening. This space is lined with a net so rigged that it can be closed like a bag and lifted. There are many variations in the designs of the traps at the end of the barrier. In the Great Lakes fisheries, the fish-traps are called pound-nets. On the Atlantic coast they are called weirs and used chiefly for taking sardines and herring. On the British Columbia coast there are a few salmon traps.

Fish-traps are costly to build. The initial investment may run anywhere from $500 to $50,000—sometimes more—according to trap size, design and nature of the area. In places where tides or currents are strong, heavy construction is necessary. For instance, the salmon traps on the west coast of Vancouver Island are probably the most expensive structures of their kind in our commercial fisheries. The stakes used are bigger and longer than telephone poles and are installed with pile-driving equipment. In Newfoundland where trap-fishing for cod is quite extensive the traps are held in place by anchors and floats rather than stakes.

Many good trap fishing areas are exposed

West coast salmon trap, showing net supported by the stakes at left.

"Seining the weir" is the term used for taking in the catch—sardines in this instance.

to heavy seas and often the traps are damaged or swept away entirely, making the cost of upkeep and replacement heavy. In winter they are unrigged and the netting and equipment are fetched ashore. In the spring, stakes which have been carried away by the ice or heavy seas have to be replaced, the brushwork repaired and the netting rigged again in preparation for the new runs of fish. Even after all this expenditure of money on labour and material, the fish may fail to appear.

The bag-net is another fixed apparatus to snare the unwary fish. It is popularly employed in fishing for smelts or tomcods during the winter months in tidal rivers such as the Miramichi in New Brunswick. As its name suggests, it is a bag of netting with a round or square mouth of varying dimensions, equipped with a funnel of netting leading into the roomy closed end of the bag. It is rigged between two poles and lowered through the ice into the water with the mouth facing the tidal current. The force of the water extends the net and it is ready for the catch. In the New Brunswick smelt fishery a more highly developed smelt trap-net that can be set in open water is replacing this gear.

In the freshwater fisheries of Ontario and Quebec, the fyke-net or hoop-net is operated in much the same way. It is a tunnel of netting distended by hoops and fastened to stakes driven into the bottom of the lake. It has an open circular mouth with wings of netting serving as leads at each side and it ends in a closed cone. The fish are deflected through a narrow throat rigged inside until they find themselves stopped by the closed end.

Newfoundland cod trap, which is held in place by anchors and floats.

Eskimos spearing fish that they have trapped in a rock dam.

Eskimos, who have always depended on fish for food, make rock dams across narrow estuaries. These dams are flooded at high tide and fish pass over them. When the tide is running out it falls below the dam level and the fish are impounded. This same principle is also used in catching flounders and other fish in the Bay of Fundy.

Surrounding Schools of Fish

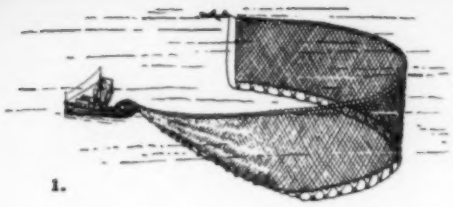
Perhaps the most productive method of catching fish, but a costly one from the point of view of expenditure on gear, is the use of a net or seine in such a way as to sweep them into a large pocket or bag. The apparatus used this way includes the purse-seines, drag-seines and otter trawls.

The purse seine is used extensively for catching schooling fish like Pacific salmon, herring, and pilchard. The seine, frequently as long as a city block, is rigged like a gill-net with corks and lead sinkers but it also has a stout rope threaded through rings along the lead line with which to "purse up" or close the bottom of the seine when a school of fish has been surrounded.

The vessels engaged in purse seining in British Columbia are power craft from 60 to 80 feet in length, broad-beamed and square-sterned and fitted with a platform aft which, mounted on a pivot, can be turned in any direction. The net is paid out from this turn-table. When a school of fish is "spotted" the vessel executes a wide circle around it. A skiff or rowboat is launched to take one end of the seine and eventually the parent craft runs out the whole of the net and joins up with the skiff bringing both ends of the net together. The bottom of the net is closed by power winches, and the mesh is hauled aboard until the fish are enclosed in but a small portion of it. By this time they are a solid flashing milling mass alongside the vessel. A dip-net or "brailer" operated by power speeds them to the hold.

Until a few years ago the success of a purse seiner's day depended upon the ability of the skipper to sight a school of fish big enough to make a set worth while. But the invention of the echo-sounder has eased the skipper's burden. Schools of fish can now be located even in darkness or fog with the aid of this electrical apparatus which was originally designed to record water depths below a ship's keel. In echo-sounding an electrical transmitter sends a sound through the vessel's bottom. This is reflected from

Salmon are brailed from the purse seine into the boat's hold. The men at left are standing on the turn-table which can be pivoted in any direction.



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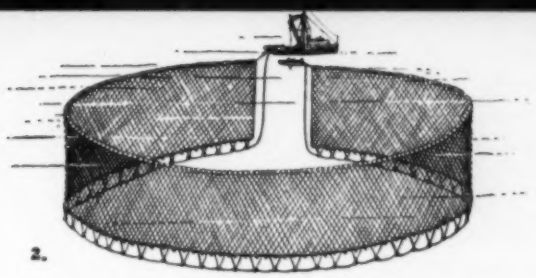


2.

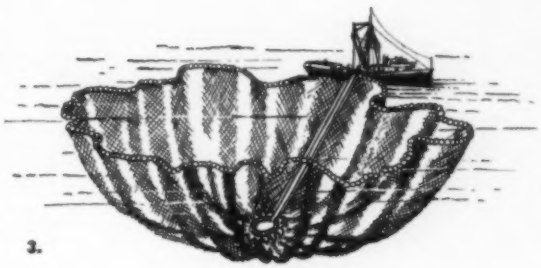
1, 2. Encircling the fish with the purse seine.

the sea-floor—in the manner of an echo from a mountain—and is picked up again by a receiver in the vessel's hull below water. The lapse of time between the transmission and reception of the sound is automatically translated into terms of depth, in fathoms or feet, which may be read on a dial or from a sheet of paper. Anything which interferes with the transmission of sound towards sea bottom is recorded by the echo sounder and fishermen have learned to recognize the patterns recorded by schools of fish passing under the ship's keel. Today the echo-sounder is widely used by fishing craft.

Once the fish have been located, there is still the job of surrounding them with the great unwieldy net and pursing it up before the whole school escapes. This calls for speed and co-ordination by all concerned. Frequently the school evades the encircling manoeuver. At other times the fish will "dive the twine" and make their way through the partially-closed bottom. There is plenty of excitement in this form of fishing and a lucky and smart crew can make some enormous hauls of fish. Thousands of salmon can be taken at one "set".

Some of the vessels engaged in purse-seining salmon and herring in British Columbia are owned by the fishermen themselves, but a great many of them are owned by the companies because the investment necessary is exceedingly heavy. Nowadays a fully-equipped vessel can cost as much as $100,000, while a salmon net comes to between $5,000 and $7,000. A herring net may cost up to $15,000.

The drag seine involves a less complicated procedure. There is no purse line on the bottom and one end of the net is made fast ashore while the other is carried out in a small boat to surround the school of fish. Newfoundland fishermen use the drag seine extensively for capturing the tiny smelt-like caplin.



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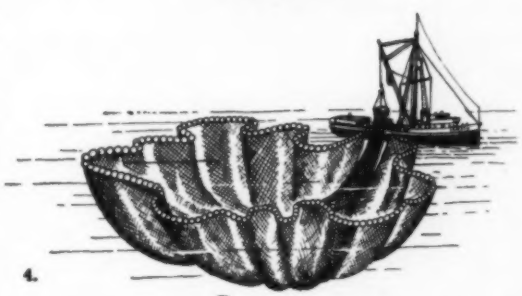
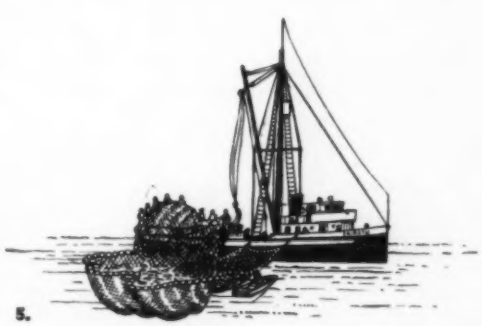


4.

3, 4. Closing the purse and drawing up the seine.



5.

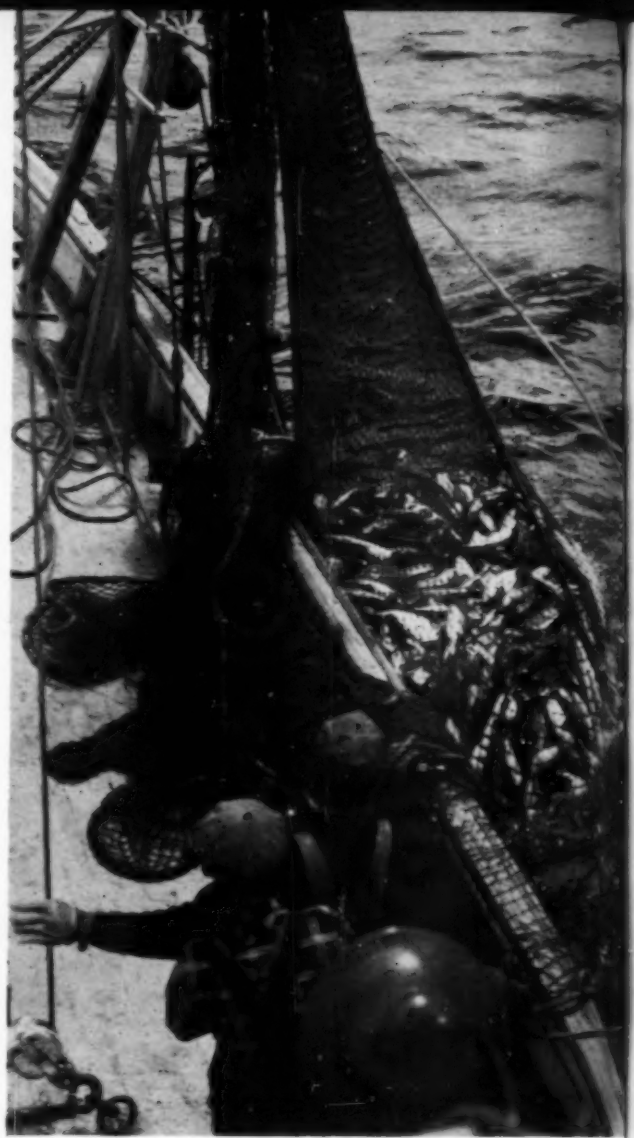
6.

5, 6. Hauling in the catch and brailing it aboard.

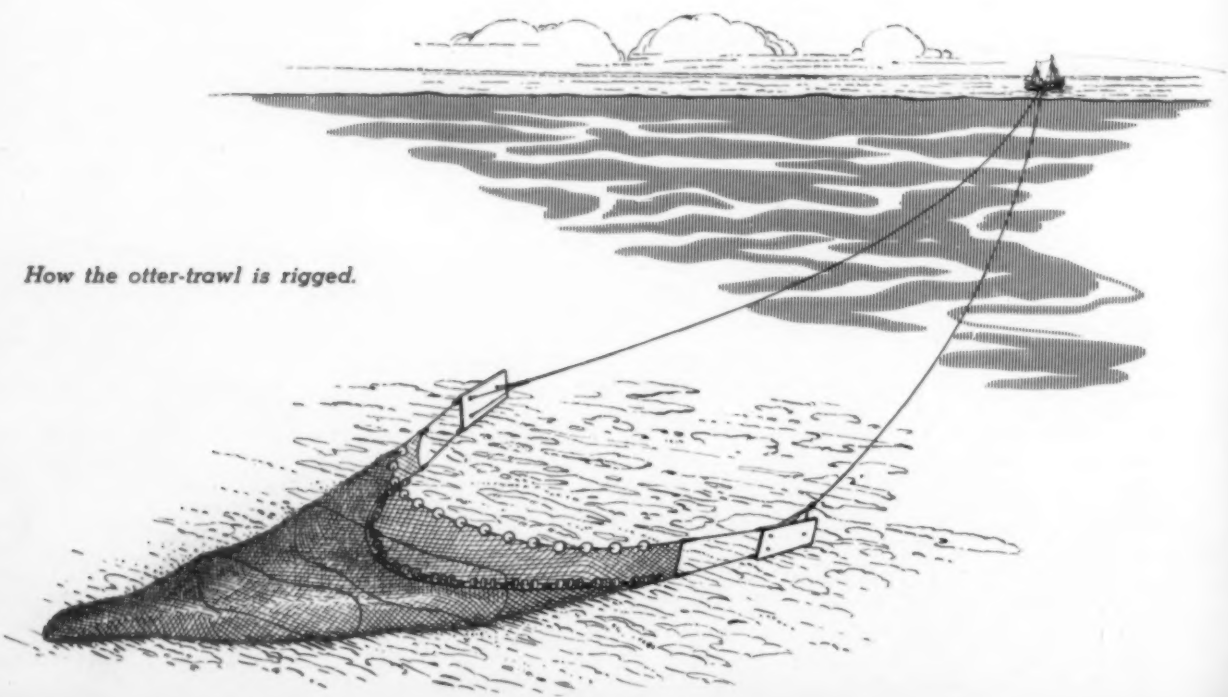
Dragging the Ocean Floor

One of the most efficient and most extensively practised methods of catching salt-water fish like the cod, haddock, flounders, hake, pollock, rosefish and other bottom-feeding species consists of dragging a huge bag-like net over the ocean floor. This is called otter-trawling. Steam or motor driven vessels, stoutly constructed with either steel or wooden hulls, and running on the average from 75 to 140 feet in length, are used and the gear is "shot" out and hauled in with powerful winches. The trawl net is actually cone-shaped, its mouth held open by two wooden wings about the size of barn doors. These are called otter-boards and when the vessel steams ahead and begins to tow the trawl, the boards act like kites and spread the mouth of the net to its widest extent. When this method was first invented in England more than eighty years ago, it was called beam-trawling because the net was held open by a wooden spar.

As the lower edge of the net's mouth drags along the bottom, it naturally has to be very strong to stand the wear and tear. It is constructed of heavy wire cable strung with hardwood rollers to ease the friction. The upper lip of the net is buoyed up with floats. The fish which are scooped up from the ocean floor, find their way into the apex of the cone called the "cod-end".



Hoisting the cod-end of the otter-trawl.



How the otter-trawl is rigged.

When the net is hauled aboard after a drag of an hour or two, the cod-end is hoisted with a winch and tackle, a draw-rope is pulled and the captured fish are spilled into pens on the vessel's deck to be sorted, dressed, washed and stowed in ice down in the hold.

This trawl gear is also fitted in smaller craft known as "draggers". During the second world war, the Department of Fisheries of Canada granted subsidies to enable Atlantic fishermen to build draggers to improve the Atlantic industry's catching efficiency. This assistance was continued in the post-war period and now extends to boats of the dragger class between 45 and 65 feet in length and to larger boats if owned by groups of fishermen. There is quite a fleet of these draggers now operating off the north shore of New Brunswick. Flounder draggers also operate off Nova Scotia and Prince Edward Island.

Admitted to be a highly efficient catching apparatus, the otter-trawler has practically superseded hook and line methods in Europe and is to be found in use by every nation which conducts a deep-sea fishery of importance. Great Britain, the United States, Germany, France, Belgium, the Netherlands, Spain, Portugal, Denmark, Norway and the Soviet Union all employ great fleets of them ranging from 125 to 250 feet in length fitted with every modern device to facilitate navigation to distant fishing grounds and every convenience for the crew and for the handling of the cargo. Trawlers from many of these countries fish the various banks off the coast of Newfoundland and Nova Scotia.

But up to and including World War II, otter trawling in Canada was restricted to about 10 large vessels on the Atlantic coast, and not more than half a dozen small craft on both ocean coasts. The Canadian fishing industry has been slow in adopting this highly efficient method of fishing, not only because of the heavy expenditure involved in obtaining suitable vessels and gear, but because there was opposition by some hook-and-line fishermen who believed that their livelihood was threatened. On the other hand, many wished to employ trawlers and argued that this method assured a regular supply of fresh fish to the market. The trawler can go to sea and catch fish in any kind of weather up to a gale and does not have to depend on supplies of bait. The subject has been a controversial one for a quarter of a century on the Atlantic Coast.

In post-war years, the legislation restricting the operation of trawlers has been relaxed to some extent by the Department of Fisheries and there is evidence that the trawler, in the Atlantic fisheries, is being accepted as an important implement in the stabilization of production so necessary to the operation of a modern fishing industry.

CAPTURE BY DIRECT ATTACK

So far we have taken a brief look at the way men catch fish for food by luring them with bait or netting them. A more elementary method, long used by the Indians, is to catch them by hand or spear them. In the far north Eskimo spear the Arctic char and on the Atlantic coast fishermen spear flounders and eels in shallow water.

A small Pacific dragger.

Harpooning a swordfish. The same method is sometimes used for blue-fin tuna.

Canadian fishermen employ the same principle in taking swordfish and whales with harpoons. The harpoon used by the whaling ships which operate off the coasts of Newfoundland and British Columbia is a formidable weapon, about four feet long and weighing about 130 pounds. It is fitted with an explosive head and wings that spring open upon entering the whale.

The harpoon used in swordfishing is a more modest affair but still a deadly weapon.

The swordfishing schooner is rigged with a "look-out" post aloft on its foremast and a small platform, called a "pulpit", on the outer end of the bowsprit. The man in the look-out post scans the sea for the fish when they are sunning themselves or swimming close to the surface. Another fisherman mans the pulpit armed with a long pole, the end of which is fitted with an iron or steel rod. A detachable barbed dart of bronze, to which a strong line is attached, is socketed on the end of the rod. When the boat comes within striking distance of the unsuspecting swordfish, the man in the pulpit drives the dart into its body. The pole is immediately withdrawn and the wounded swordfish, with the dart buried in its back, frantically takes off to put as great a distance as possible between it and its attacker. It cannot go very far or fast, however, because the other end of the line is fastened to a wooden keg or buoy which acts as a drag. A dory is launched and a fisherman pulls toward the buoy and secures it. Then the line is hauled in and the exhausted swordfish is brought alongside.

Oysters are raked up with long-handled tongs.

Raking Shellfish Beds

A specially-designed pair of tongs or a chain-meshed dredge are the less exciting but highly profitable means of taking oysters and scallops. Fishing for scallops is a cold, wet occupation since the best grounds are the exposed waters of the Bay of Fundy off the Nova Scotia coast near Digby. The scallop dredge is a chain-meshed bag, fixed to an iron frame. Several of these are dragged over the sea bottom by diesel-powered boats and are hauled up by power-driven winches. The dredge picks up a lot of rocks and debris in addition to a number of unwanted aquatic animals and the fishermen have to sort the wheat from the chaff, so to speak, each time the dredges are emptied on deck.

Oysters are taken from the bottom by long tongs manipulated by hand from open boats. They are also taken by dredging apparatus somewhat similar to the scallop drag. Clams and quahaugs are dug out with rakes and forks of various kinds when the tide is out. When the grounds are submerged and fishing has to be done with boats, the rakes are fitted with long handles.

Development

These, then, are the principal methods of fish-catching in Canada's commercial fish-

eries. There is no doubt that new methods will constantly be introduced and tried since the fishing industry is progressive and attempts to reduce the cost of capture while increasing the efficiency of the apparatus employed.

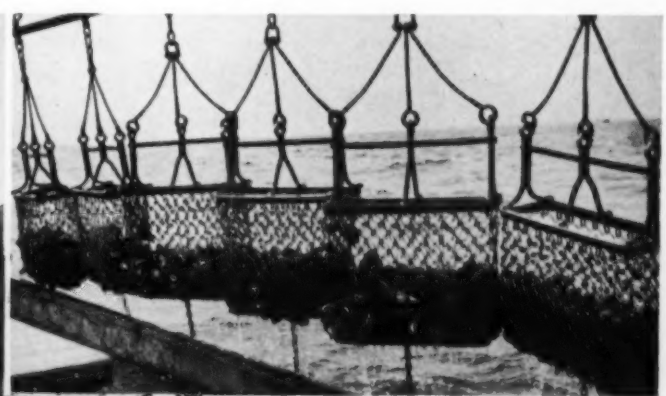
Lending a helpful hand is the Fisheries Research Board of Canada, the scientific branch of the Department of Fisheries of Canada. Only a short time ago, the Board successfully demonstrated to the inshore fishermen of St. Mary Bay and Minas Basin in Nova Scotia, how flounders could be caught in quantity by the use of small dragging gear. Demonstrations of the use of powered haulers in small line-fishing boats led to their widespread adoption in the Atlantic inshore fishery. Tests have been conducted with the two-boat mid-water Larsen trawl and with drift-nets as a means of catching herring. Experiments have been sponsored by the Board and the Department to test the efficiency of long-line fishing for cod off the coast of Newfoundland.

Canada's Fishing Fleet

The most recent statistics indicate that Canada's commercial fishing fleet numbers more than 40,000 vessels and boats of all kinds ranging in size from the steam trawlers to row-boats.

This represents an investment of something like $60,000,000 including the gear and equipment, but not the shore establishments. About 110,000 men derive all or part of their living from the Canadian commercial fisheries. Some keep to only one branch of the industry such as the crews of vessels engaged in deep-sea fishing. Others turn from one branch to another with the seasons.

Many fishermen, on the other hand, combine farming with fishing. Some cut wood in the winter when ice interferes with the fishing. Some earn thousands of dollars a year and others make but a bare living. Fishing is a gamble—either a feast or a famine in many cases—but it offers a rugged, out-in-the-open, independent life which has a distinct appeal to many men. They are the sturdy types who find a fascination in the adventurous gamble—in matching their skill, wits and strength against the elements. They are good citizens and good Canadians.



Chain mesh dredges are used to harvest scallops. Fishermen sort the scallops from the rocks, starfish and flat-fish that are picked up.

Drawings by
Fairbairn Studio, Ottawa.

This little Eskimo girl, Anerk, looks much bigger than she really is in her warm artiggi; *this is a caribou tunic and hood, worn by Anerk above trousers from the trading post and sealskin boots.*

Some Eskimos of Chesterfield Inlet

by JEAN P. MICHÉA

Chesterfield Inlet is situated on the west coast of Hudson Bay, about 330 miles north of Churchill. It cuts inland some 150 miles from the Bay to Baker Lake, serving as a means of communication, by canoe for approximately twelve weeks in the summer, by sled for the greater part of the year. The settlements of Chesterfield Inlet, on Hudson Bay, and Baker Lake, at the mouth of the Thelon River, have trading posts, R.C.M.P. detachments, government scientific stations, missions and the former has a hospital and medical officer. Local Eskimos come in to the posts to trade their winter's catch of furs, often setting up their tents for a sociable gathering during the summer, the while they fish, or perhaps unload a ship at Chesterfield. In the autumn they go inland to hunt caribou, upon whose abundance their well-being largely depends.

In every Eskimo community the family unit is all-important. Children are treated with unfailing kindness and lead happy, unrestricted lives. Babies often remain naked until they are three or four years old. They are carried in the pouched back of the mother's artiggi. *In summer, home may be a tent; in winter it is more often a snow house. Wherever it is the youngsters will spend carefree years as they painlessly learn the ways and speech of their elders.*

The economy of these eastern Eskimos depends to a great extent upon the seal, sea mammal of many uses to the Eskimo in his daily life, the caribou and the fox. It might be said that the fox is related to the modern trend in Eskimo life for pelts are traded for flour, tea, petroleum, fabrics, cartridges, traps, planks, nets, canoes, boat motors; the caribou stands for the traditional, providing, as it does, flesh for food, furs for clothing, fat for heating, antlers and bone for making fishing, hunting, and household implements. Caribou are hunted during their autumn migration and when they are plentiful the Eskimo is assured of a comfortable winter; in years of scarcity he faces cold and short rations, and disaster, since he will weaken, his dogs be underfed and his trapping suffer.

Above:—Sled and resting dog-team; without these the Eskimo would be unable to travel across the frozen northland in pursuit of the quarry that provides his means of livelihood. Here the ice is breaking up in the spring thaw but there will not be open, navigable water until the end of July.

Left above:—A great treat is frozen, raw caribou meat. This Eskimo cuts off a piece close to his mouth with a woman's curved knife.

Left:—Surplus caribou meat is dried for use later on.

Left:—It is spring, for the Eskimo is wearing his goggles to protect his eyes from the glare, and by this time his caribou clothing is somewhat shabby. In his right hand he carries a harpoon for spearing seals when they appear at their breathing holes, in his left a knife for cutting blocks of snow.

Above:—Sled runners are coated with mud and smoothed. The frozen surface is then given a coating of ice to ensure easy running and minimum of friction.

Above left:—Men and women fish through holes cut in the ice, especially in the autumn when the ice is only a few inches thick. They spend long hours squatting patiently beside the hole.

Above right:—The woman wields her knife on salmon or arctic char which will be dried for winter consumption. Good use will be made of heads and bones. Notice the tattooing on her face and hands.

Below:—An Eskimo child softens a piece of leather by chewing it. Sometimes skins have to be softened in this way before sewing, or water-hardened boots may be so treated.

In general, the Eskimos have proved both wise and wary in their dealing with the white man, adopting his imports after applying the test of utility or enjoyment rather than being dazzled by the novelty of all "foreign" wares. The smoking of cigarettes (Arta-look, the tattooed lady below enjoys hers) and pipes by the natives is now general, while eye-glasses and playing-cards (above) also appear to have proved their worth to this Eskimo grandmother!

Below:—This girl in her best costume displays a fine example of Eskimo beadwork; the colourful design is the product of many hours of patient stitching.

EDITOR'S NOTE-BOOK

Hedda Morrison was born in Germany, where she studied photography. In 1933 she went to China as a professional photographer and lived there many years. She married an Englishman in China, later going to England. Subsequently, Mrs. Morrison and her husband returned to the East and for the past three years they have lived in Sarawak.

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F. H. Wooding is director of the information and educational service of the federal Department of Fisheries at Ottawa. He has travelled extensively throughout Canada and has a first-hand knowledge of the commercial fishery. He has written many articles on subjects connected with the fisheries for periodicals in Canada and other countries.

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Douglas Leechman has for many years worked in the division of anthropology of the National Museum of Canada, where he is senior archaeologist. His books and articles are well known, his latest book being *Indian Summer*, published by Ryerson.

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Jean P. Michéa is a Frenchman who came to Canada some years ago and has spent considerable time in the Baker Lake region of the Northwest Territories.

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ERRATUM

Vol. XLIII No. 2, August 1951: On page 85 delete the last three words, young papaya trees, and substitute, shoots of a cassava plant.

AMONGST THE NEW BOOKS

Principles of Human Geography

by the late Ellsworth Huntington, revised by Earl B. Shaw
(John Wiley and Sons, New York, $6.25)

This is the sixth edition of the classical work by the late Ellsworth Huntington which first appeared some thirty years ago. The first edition "differed principally from other advanced textbooks of geography in its concentration on human relationships". Many books had been written on anthropogeography, but none summed up the subject and at the same time translated it "into the simpler terminology of human geography". The sixth edition has preserved this philosophy, therefore only the main outlines of physical processes and forms are presented in order that emphasis can be placed on the interaction of the physical environment and man's activities. Thus the titles "Man's relation to Land Forms", "Man's relation to Soils and Minerals" and so on. Unfortunately, some of the diagrams illustrating the physical processes, simple though they are, have not been superseded by more accurate ones. For example, one would have expected the sixth edition to replace such diagrams as those related to an idealized cyclone. Elsewhere, when diagrams have been added or revised, the choice, or method of reproduction, has not been successful. The two pages of map projections, for instance, are not only crude, but unscientific, the most obvious omission being the numbering of the parallels and meridians! Lobeck's diagrams in *The Earth in Space* were never very clear and their reproduction in *Principles of Human Geography* has not improved them.

The strength of the sixth edition, like its predecessors, lies in the descriptive explanations and interpretations —the how and why of human adjustment. But occasionally even these suffer from over-simplification and reflect the determinism of the 1920's. Witness the sentence "Japan's behaviour is in harmony with the geographic environment". Over-simplification has often led to over-generalization. Thus it is difficult to accept, without qualification, the argument that "large political units almost invariably have trouble because of their great diversity" particularly since the examples cited not only include the U.S.S.R., Canada and China but also Peru and Bolivia. In the case of Canada, at least, it is not easy to see how her "troubles" have been any greater than those of England, Wales, Scotland, Eire and Northern Ireland or of Belgium, even disregarding the time element. Furthermore, the statement that "the history of Canada is full of conflict between French Quebec and English Ontario" is not even historically correct, since Ontario as a political unit did not come into being until after the major French-English (British) conflicts, nor does it have any real relationship to the size of Canada today or the size of British North America between 1776 and 1867.

There are other examples in the book of loosely expressed arguments, for instance "A Climatic Comparison: The Bahamas and Canada". In spite of the title, the author(s) go on to say that they intend to compare the Province of Ontario with the Bahama Islands. At the same time it is stated that "the climate of Ontario is one of the best in the world". Presumably this refers to the climate of London, Toronto or Kingston rather than that of Moosonee. Later, during the comparison the term "Canadian" is used synonymously with "Ontarian". It is further inferred that an "Ontarian" is mainly a descendant of the Loyalists who left the U.S.A. at the time of the Revolution.

The simple style of the text is not always followed out in the illustrations. The truly geographic pictures remain as excellent, and numerous, as ever and are teachers in themselves, but the photo-diagrams, such as the "Occurrence of oil in the ground" and "World's Oil Sources" are not clear in the reproduction and have no explanatory legend which would have partly overcome this difficulty.

While this book will undoubtedly be sought by those who have not been able to add one of the previous editions to their library, it is questionable whether such a classical text should have been revised (sic) or whether an entirely new human geography text should have been

written, leaving the original to stand on its own merits as a milestone in the development of a particular field of endeavour.

NORMAN L. NICHOLSON.

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Climate Through The Ages

by C. E. P. Brooks

(Revised edition, McGraw-Hill Company of Canada, Toronto, $5.45)

The first edition of this well-known study of climatic change (1926) achieved a reputation as a leading reference work in its field. Its author, Dr. C. E. P. Brooks, former senior climatologist in the British Meteorological Office, has marked his retirement by publishing an extensively revised second edition. Like its predecessor, it must have a place on every geographer's bookshelves.

The plan of the book has been preserved intact, though several of the chapters have been entirely rewritten. Part I deals with the various elements of climate and the extent of their variations. Brooks attempts to find quantitative measures of the effect of change in one element on another. Particularly valuable is his review of the normal climate of non-glacial periods in the past.

Part II discusses the climates of the geological past, with particular reference to the Permocarboniferous and Pleistocene glaciations. Great stress is laid on the theory of continental drift, and a careful examination of the climatic evidence for (and, even more, against) the Wegener-Köppen reconstruction of past climates in terms of drift seems now to lead the author to a hostile verdict. Part III includes a review of the climatic fluctuations of the historical period. Since Brooks wrote, H. W. Ahlmann has published several brilliant reviews of this latest aspect of climatic change. It is unfortunate that the book contains no reference to Ahlmann's syntheses; his papers have touched off a vigourous rediscussion of the entire field.

Climate through the Ages does not set out to be a primer of climatic change. The book is in essence an interpretation of the existing evidence in the light of sound meteorological theory, and as such it has no rivals in the English tongue.

One can criticize details. Brooks sometimes allows his climatological pen to outrun the reader's experience. In other ways his style is attractive, his writing simple and unpretentious. Speaking, for instance of periods that have been termed "pliothermal", he says: "I prefer the simpler word 'warm', which means the same." One could wish that Dr. Brooks's humility were more often encountered.

F. K. HARE

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The Physiography of Southern Ontario

By L. J. Chapman and D. F. Putnam

(University of Toronto Press — Saunders, 1951 $4.00)

For the past fifteen years or so whenever a geographer has begun a study of any part of Southern Ontario he has first visited the Ontario Research Foundation to consult the results of the physiographic research of Chapman and Putnam. Now, at last, these results have been drawn together in the most significant book on the physical geography of Southern Ontario ever to be published.

The book is essentially a description of the surface of "the agriculturally developed portion of Ontario, which, for the most part, lies to the south of the Canadian Shield, including the southwestern peninsular area bounded by the Great Lakes, together with the lowland between the Ottawa and St. Lawrence Rivers."

After a short chapter on the bedrock, the general features of the glacial geology are outlined. This includes a discussion of the moraines, drumlins, eskers, spillways and features associated with glacial lakes, together with maps showing the precise location of the first four of these and the glacial lake shorelines. The chapter concludes with a summary of the stages of recession of the Wisconsin ice sheet, illustrated by twelve maps, which the authors regard as one of the more important contributions of their study.

The individual surface physical features were mapped in the field with the aid of aerial photographs. The results appear here in colour, on a map whose scale is about four miles to the inch — a visual witness to the great amount of research which went into its compila-

(*Continued on page XIV*)

(*Continued from page XI*)

tion. Since each lot and concession line is shown on the base map, it is easy to locate the exact extent of each feature. Chapter 3 supplements the map in that it is concerned with a description of these features. The morainic systems are described in thirty parts; the "six to seven thousand" drumlins are discussed in four groups (those of the Lake Ontario ice lobe, Georgian Bay Ice Sheet, Simcoe and Kawartha Lakes Ice Sheet and the Eastern Ontario field) and the eskers, abandoned shorelines and lacustrine sediments detailed with similar precision. The chapter concludes with an account of each of the major rivers of Southern Ontario grouped according to the six drainage basins — Georgian Bay, Lake Huron, Lake St. Clair, Lake Erie, Lake Ontario and Ottawa River. The account includes a discussion of the relationship of the streams to the Pleistocene deposits.

The fourth chapter is the longest and perhaps, to the "pure geographer", the most useful. It is concerned with the correlation of the results of analysis which preceded it. It recognizes that "in terms of its gross structure" Southern Ontario consists of four natural divisions — Southwestern Ontario, the Niagara escarpment, South-Central Ontario and the lowland between the St. Lawrence and Ottawa rivers. The local landforms occur within these divisions and when considered in relation to one another and post-glacial drainage, fall into minor physiographic regions. The authors have distinguished between fifty-two of these regions, each having characteristics of its own. For instance, they "have noticed that the Peel plain has a personality because it has a name by which it can be set apart from other clay plains in Southern Ontario". The regions are shown on a map and described mainly from the point of view of their topographic form and composition of the surface desposits. Nevertheless, the interrelationships between these physical characteristics and the pattern of roads, railways, land use and settlement are mentioned, and well illustrated with some seventy photographs.

A short glossary of terms and a bibliography of 112 items complete the book which will be of inestimable value to all teachers of geography, agriculture and geology and of interest to all to whom "the beauty of the landscape will not be diminished but enriched by the background which this work affords".

NORMAN L. NICHOLSON